For citation: Petrov M. B., Kurushina E. V. & Druzhinina I. V. (2019). Attractiveness of the Russian Regional Space as a Living Environment: Aspect of the Migrants' Behavioural Rationality. Ekonomika Regiona [Economy of Region], 15(2), 377-390

doi 10.17059/2019-2-6
UDC: 332.1+314.7

M. B. Petrov [a], ***E. V. Kurushina*** [b], ***I. V. Druzhinina*** [a]

[a] Institute of Economics of the Ural Branch of RAS (Ekaterinburg, Russian Federation)

[b] Tyumen Industrial University (Tyumen, Russian Federation; e-mail: kurushina.tsogu@yandex.ru)

ATTRACTIVENESS OF THE RUSSIAN REGIONAL SPACE AS A LIVING ENVIRONMENT: ASPECT OF THE MIGRANTS' BEHAVIOURAL RATIONALITY [1]

This study focuses on the rationality of the migrants' behaviour. We hypothesise that the migration growth rate depends on the territory attractiveness for living. The rational behaviour is defined as the direct dependence of the migrations on the characteristics of the territory attractiveness. The irrational behaviour means that the reverse dependence is present. The direct dependence is recognised if the level of the migrants' positive reactions to the factors of the territory attractiveness is no less than 30 % from the maximum. 83 subjects of the Russian Federation were clustered based on 12 objective characteristics of the life's quality. We distinguished the largest Middle Cluster, which includes 56 regions. Further we transformed the panel data for the period from 2005 to 2015 into the array of the coefficients of correlations between the characteristics of the territory attractiveness and the migration growth rates in the regions. Using these characteristics, the regions were clustered again. The regional types of the Middle cluster with the rational and irrational behaviours include 22 regions each. The level of the migrants' positive reactions to the factors of the territory attractiveness is 44.1 % for the first (rational) regional type and 42.5 % for the second (irrational) type. The regional type with the indifferent behaviour includes 12 regions. The level of the migrants' reactions to the characteristics of these territory attractiveness is just 5.8 %. Based on the regression models of the migration coefficient for each cluster type, we have provided recommendations for managing the migration flows using the differential approach.

Keywords: spatial development, territory attractiveness, objective and subjective factors, quality of life, rationality of behaviour of migrants, human capital, interregional migration, regional clusters, physical space, institutional space

1. Introduction

One of the important tasks in the current agenda of the Russian government is the implementation of the strategy of the spatial development. According to the Federal Law (No. 172-FZ) "About strategic planning in the Russian Federation", this strategy should identify the priorities, goals and tasks at the regional level. Moreover, it should aim to maintain the sustainable system of resettlement within the country's territory[2]. The main provisions of the spatial development strategy, among others, include:

1) forecast on the demand for workforce in the Russian Federation's subjects;

2) mechanisms of the resettlement stimulation in accordance with the priority directions for the system's improving;

3) results of the classification of the Russian Federation's cities and regions (Resolution of the Government No. 870, 2015)[3].

In an era, when the human potential is of critical importance for the economic growth, the factors attracting the foreign employees are as important as the factors preventing emigration [1]. This is also valid for the interregional migration in the Russian regions, majority of which are characterised by the low economic and demographic density, and insufficient innovation activity. Migration affects the economic growth not only with regard to the new set of skills and innovations, but also with regard to the cultural diversity [2]. Daunton [5] highlights the interconnection of the economic growth with resettlement processes,

[1] © Petrov M. B., Kurushina E. V., Druzhinina I. V. Text. 2019.

[2] Federal law (No. 172-FZ) "On strategic planning in the Russian Federation". Retrieved from: http://economy.gov.ru/minec/activity/sections/strategicPlanning/regulation/20151113. (Date of access: 15.09.2018).

[3] Resolution of the Government of the Russian Federation from August 20, 2015 No. 870 "The content, composition, procedure of development and approval of the strategy of spatial development of the Russian Federation, and also about the monitoring procedure and the monitoring of its implementation". Retrieved from: http://economy.gov.ru/minec/activity/sections/planning/sd/870 (Date of access: 15.09.2018).

population density and healthy environment for migrants. He refers to the studies of Acemoglu and Johnson [3], and Acemoglu, Johnson and Robinson [4] on the institutional changes. Migration flows are connected with the attractiveness of the countries (regions) and the expectations of migrants [6]. The rational human model (homo economicus) substantiates this approach. The attractiveness of the area for resettlement is assessed by the maximization of the household incomes [7], capital city status [8], housing prices [9]. Many researchers consider the unemployment situation as one of the main factors influencing the resettlement of people. Migration processes depend not only on the changes in the labour market but also on the "quality of life" in the regions [10]. We conducted the study of the methods of the life's quality assessment. The study has revealed that, generally, the unemployment indicator is a component of the quality of life. These methods of the life's quality assessment can be applied for shaping the system of indicators-factors of the territory attractiveness for migrants. We distinguished the following indicators-factors:

1) Quality-of-life index suggested by the Economist Intelligence Unit[1];

2) Human Development Index by United Nations Development Programme[2];

3) The OECD Better Life Index[3];

4) Method of the rating agency RIA Rating[4];

5) Indicators developed by the Russian and foreign scientists, such as Stiglitz, Sen, and Fitoussi [11]; Chereshnev and Tatarkin [12]; Drobysheva and Gerasimov [13]; Grinchel and Nazarova [14].

We claim that making a decision on migration depends not only on the objective characteristics of the attractiveness of the territory for resettlement. according to our concept [15, 16], the regional space is stratified as: 1) material and physical sphere (income of the workers, density of the transportation network, living conditions, etc.); 2) institutional sphere (entrepreneurial environment, innovative climate); 3) mental sphere (values, language, religion, cognitive processes). Characteristics of the material and institutional space are reflected in the human consciousness, in its' mental space. Tkachev and Lutsenko [17] distinguish the concepts of the external assessment of the quality of life and the self-estimation based on the system of human values and expectations. The presence of the objective and subjective (psychological) components in the assessment of the life's quality, related to the particular qualities of the territory of living, is recognized by Costanza [18], Cummins [19], Inoguchi and Fujii [20], McCrea, Stimson and Marans [21], Savchenko and Golovina [22]. Therefore, despite the objective characteristics, the migration is influenced by the hidden characteristics of the mental space. They are related to the migrants' system of values and their rationality, or the "reflexed" characteristics of the quality of life. In addition, the theoretical and methodical basis of the study on migration includes the model of economic (rational) human of the classic and neoclassic schools [23], the theory of mental spaces [24], and the theory of the restricted rationality [25].

Based on the theoretical sources and the results of the migration processes' analysis, we defined the scope of the research as filling the gap of testing the regions on the rationality of migrants' behaviour regarding the characteristics of the territory attractiveness for living. Obtaining the analytical materials on the migrants' reactions allows identifying the types of regions. It helps to further define the strategy of the Russian spatial development and to develop the mechanisms for implementing the resettlement policy. To solve the defined problem, we set the following objectives:

1) substantiation of the system of indicators to assess the territory attractiveness for migrants;

2) verification of the hypothesis about dependence of the migration growth rate from the quality of life in the Russian regions;

3) identification of the clusters in terms of the objective characteristics of the regional attractiveness;

4) determination of the degree of the rationality of the migrants' behaviour for each region and each factor;

5) classification of the regions using the migrants' behaviour rationality degree;

6) building the regression models of the migration growth rate for the regional types according to the migrants' behaviour rationality degree;

7) summarising the recommendations for managing the regional attractiveness for migrants using the differential approach.

The objectives define the article's structure. Introduction provides the short overview of the

[1] The Economist Intelligence Unit's quality-of-life index (2005). The world in 2005. Retrieved from: http://www.economist.com/media /pdf/QUALITY_OF_LIFE.pdf. (Date of access: 15.09.2018).

[2] Human Development Report 2015: Work for Human Development. Retrieved from: http://hdr.undp.org/en/composite/HDI. (Date of access: 15.09.2018).

[3] The OECD Better Life Index (2015). Retrieved from: http://www.oecdbetterlifeindex.org/. (Date of access: 15.09.2018).

[4] Reiting Rossiyskikh regionov po kachestvu zhizni — 2013 [The rating of Russian regions for quality of life (2013)]. RIA Rating (2016, April 15). Retrieved from: http://www.riarating.ru/ (Date of access: 15.09.2018).

theoretical background and scientific results of other studies relevant to this study. Section Data and Methods reveals the approach to substantiate our system of indicators for assessing the regional attractiveness, the choice of the regions to be tested on the rationality of the migrants' behaviour, the database of the employed data, and the details of the method we applied. Results section consists of 4 subsections, and each of them shows the results of the separate analysis of the statistical data. Our comments about the most attractive identified features of the regions are given in Discussion. General outcomes of the research are presented in Conclusions.

2. Data and Methods

We consider application of the interdisciplinary approach as expedient for studying the migration processes. This is substantiated by the application of the concept of the quality of life for assessment of the territory attractiveness. This concept, according to the definition by Marans [26] guarantees the interdisciplinary research. To prove this fact, Mohit [27] investigates the quality of life from the standpoints of 9 disciplines, and the interconnection with the Economics, Political Science, Sociology and Psychology is the most important for the current research. Interdisciplinary approach of Brock [28] suggests the possibility to assess the quality of life in several directions, including: 1) valuable and normative aspect; 2) aspect of satisfying the needs; 3) behavioural aspect. Studying the influence of the quality of life on the behaviour of tourists, Xiong and Zhang [29] refer to this approach as the life-oriented. In the scientific literature, especially in Russian studies, this approach is called human-oriented or human-centric.

In the current research, the content theories of motivation [30, 31, 32, 33, 34, 35] and the approaches from the standpoint of the quality of life are utilised to substantiate the system of characteristics of the regional attractiveness. In the previous works [36], we applied 16 factors of the territory attractiveness, representing the physiological needs of migrants, the security and safety needs, the needs of communication and the needs of achievement.

We utilise the method of calculation of the life's quality and data from the rating agency RIA Rating[1] for the overall assessment of the attractiveness of the Russian regions. This method is chosen as the most relevant to the authors' approach to assessing the regional attractiveness from the viewpoint of the system of the migrants' necessities. The comparative characteristics of the method to assess the quality of life by RIA Rating and the authors' approach of motivation of migrants to settle in the regions are given in the Table 1.

Comparability of the presented approaches allows utilising the data published by RIA Rating for the Russian regions to check the hypothesis about the influence of the quality of life on migration.

To study the influence of each factor, 12 indicators from 16 are considered in the current work, as shown in the Table 1. The indicators are selected depending on their importance. The information database for indicators ($\{I_i\}$, where i = 1, 2, 3, ..., 12) for the period from 2005 to 2015 is formed on the basis of the data by Federal State Statistics Service[2] about the socio-economic development of the regions of the Russian Federation.

The migration data are assessed in terms of the coefficient of the migration growth rate (migration intensiveness coefficient), which is calculated as the relationship of the migration growth rate to the average annual number of the resident population. At the same time, the migration growth rate of the population is the absolute value of the difference between the number of people arrived on this territory and the number of people departed from this territory during the defined time interval.

The data for 82 regions of Russia for 2005–2015 are utilised in to check the hypothesis about the influence of the life quality indicators on the migration growth rate coefficient. The next objectives related to the assessment of the rationality of migrants' behaviour require selecting 56 regions with more homogeneous characteristics from the full list using the clustering procedure to ensure the correct analysis. This study involves the method of multidimensional statistical analysis, including correlation, regression and factor analysis using the IBM SPSS Statistics package.

3. Results

3.1. Testing the hypothesis about the dependence of the migration growth rate on the quality of life in the Russian regions

Creation of the economic mechanisms to stimulate the resettlement on the basis of managing the

[1] The rating of Russian regions for quality of life (2013). RIA Rating (2016, April 15). Retrieved from: http://www.riarating.ru/. (Date of access: 15.09.2018).

[2] Regiony Rossii. Sotsialno-ekonomicheskie pokazateli. 2017 [Regions of Russia. Socio-Economic Indicators. 2017]. Rosstat [Federal State Statistics Service]. Retrieved from: http://www.gks.ru/. (Date of access: 15.09.2018)

Table 1

Comparative characteristics of the approaches to assessing the territory attractiveness

Ria Rating	Authors' approach	
Components of quality of life	**Motivational factor**	**Territory attractiveness characteristics**
	1. Physiological needs	
Population income level	Level of living	Real wages (I_1)
Housing conditions		Provision of new housing (I_2)
Ecological and climatic conditions	Auspiciousness of environment	Life expectancy (I_3)
	2. Safety needs	
Safety of living	Physical safety	Crime rate (I_6)
		Provision of medical assistance (I_{13})
Population income level	Social safety	Level of pensions (I_5)
Level of economic development		Unemployment rate (I_4)
	3. Communication needs	
Demographic situation	Opportunities for communication	Population density (I_7)
Provision of social infrastructure		Provision of cultural objects (I_{16})
	Auspiciousness of environment	Coverage of children with pre-school education organizations (I_{14})
Population health and level of education	Educational environment	Number of students in higher professional education per 10 000 people (I_{15})
Utilisation of territory and development of transportation infrastructure	Provision of infrastructure	Density of motorways (I_8)
Level of economic development		Communication services per capita (I_9)
	4. Achievement needs	
	Competitiveness of productions	Exports per capita (I_{10})
		Share of innovatively active enterprises (I_{11})
Development of small business	Entrepreneurial environment	Share of workers in small enterprises in total number of workers (I_{12})

parameters of the life's quality in the regions makes sense in the case when the condition of the absolute rationality of migrants is satisfied. Empirical and experimental studies conducted by Tversky and Kahneman [37] and Smith [38] in the area of economic behaviour indicate that people may behave irrationally in the real life. To check this hypothesis, we investigated the dependence of the migration growth rate in the Russian regions on the level of territory attractiveness in terms of the quality of life. The results of the analysis for 82 subjects of the Russian Federation (excluding the Chechen Republic) using the data of the rating agency RIA Rating are illustrated on the Figure 1.

The shown data, in general, allow tracing the relationship between the migration growth rate and the level of the life's quality of population in the Russian regions. At the same time, the migratory increase in some regions (25 regions), especially in the Republic of Ingushetia, Leningrad and Tyumen regions, is much higher than the average Russian trend. In the Yamalo-Nenets Autonomous region, the Republic of Komi, Magadan, Murmansk and some other regions (21 regions in total), the migratory increase is much lower. It is found that 46 regions demonstrate the values outside the confidence interval in the model of interconnection of the migration growth rate coefficient and the quality of life (Figure 1), that is 56 % from the overall complex of regions. This leads to two conclusions: 1) not all of the migrants behave rationally; 2) regional space of Russia is heterogenic not only in terms of the objective characteristics of regions, but also in terms of the subjective characteristics. It is essential to study the regional features and distinguish the types of regions from the viewpoint of the territory attractiveness for migrants to manage the resettlement effectively on the territories of all regions.

3.2. Clustering of the Russian regions in terms of the objective characteristics of the territory attractiveness

Identification of the regional types can be conducted in terms of different features depending on the defined objectives [39]. Based on the distinguished approaches to assessment of the quality of life, the clustering of the regions can be conducted in terms of objective and subjective characteristics, assessing the rationality of migrants' behaviour. 83 regions of Russia are studied in terms of 12 indicators characterising the territory

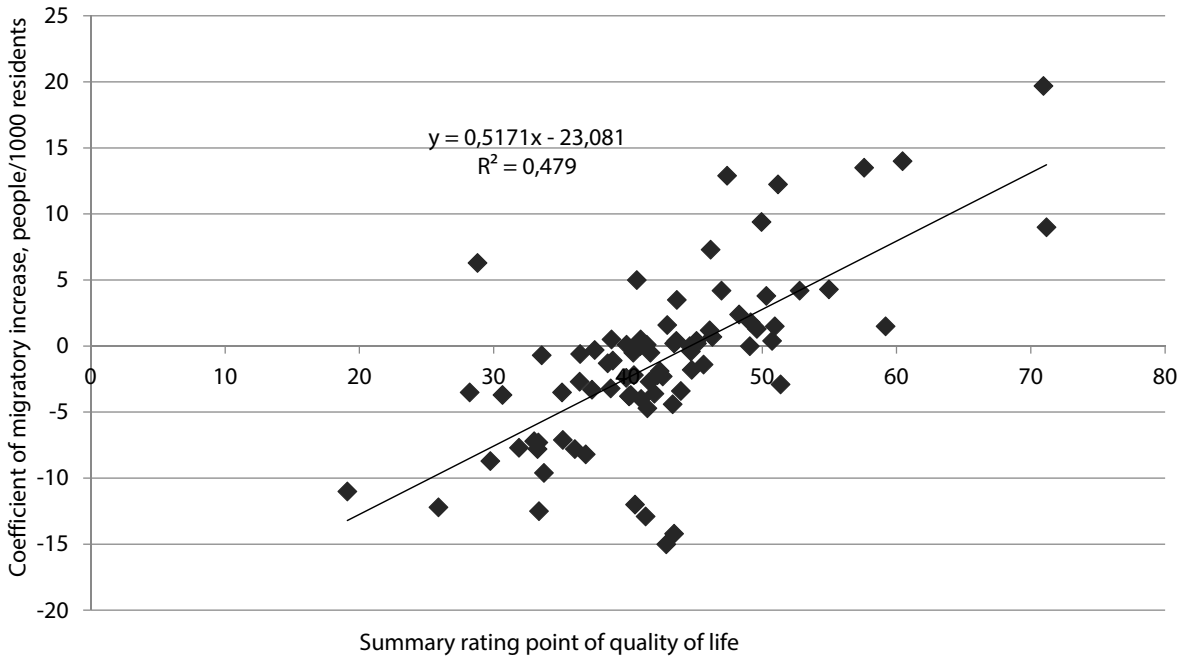

Fig. 1. *The dependence of the coefficient of migratory increase (growth rate) on the quality of life in the regions*

attractiveness for living in 2005–2015. Combining the regions using the Ward's method on the sixth level of agglomeration allows identifying 4 groups of the regional clusters which are called in accordance to their spatial characteristics. The Middle cluster contains 56 subjects, the Northern cluster — 18, the Southern cluster — 7, the Agglomeration cluster — 2 subjects.

The Middle cluster is the largest one, as it includes 2/3 of the regions, and therefore, is typical for Russia. It is named "Middle" because for two reasons. Firstly, it covers the territories in the central continental part of Russia, including all are the subjects of the Central (without Moscow), Northwestern (without the Murmansk region and the Nenets autonomous region), Southern (without Kalmykia) and Volga federal districts. Moreover, it includes the subjects of the western part of the Siberian federal district, which have the highest level of development. Secondly, the Middle cluster justifies its name because the indicators characterising its attractiveness for living (Figure 2) are the closest to the average values for the whole complex of subjects (by 100 % in the standardized expressions).

3.3. Classification of the regions by the degree of rationality of the migrants' behaviour

Study of the subjective factors of the Russian regions' attractiveness is conducted based on the investigation of the migrants' rationality of behaviour. In contrast with the classical model of

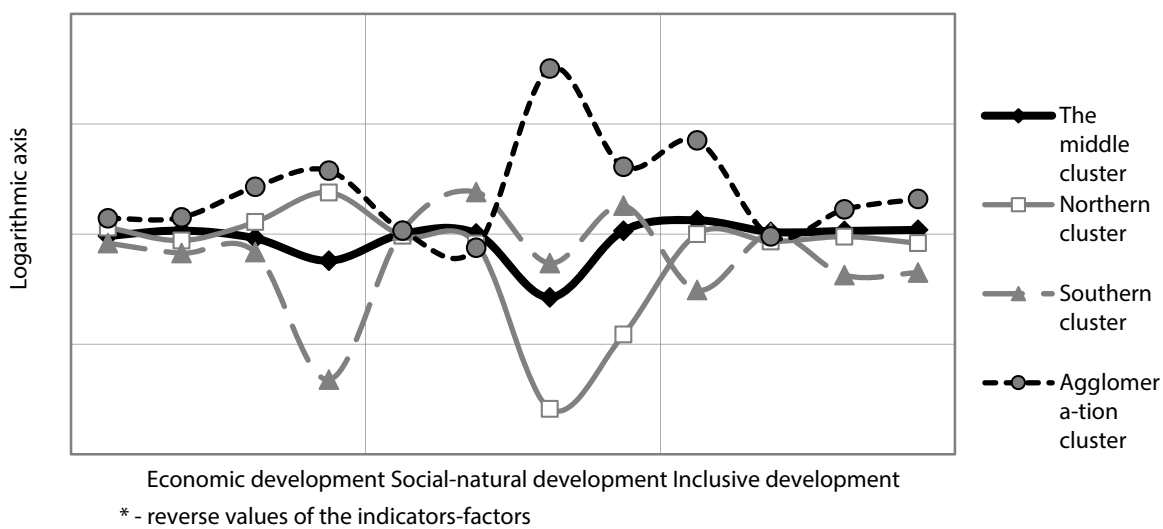

Fig. 2. *Standardized average values of the indicators-factors of the territory attractiveness for regional clusters in 2005–2015*

Table 2

Distribution of the Russian regions by types based on the degree of rationality of migrants' behaviour in the Middle cluster

Federal district	Number of subjects in district — overall	including subjects of Middle cluster							
		total		including types of migrants' behaviour					
				rational		indifferent		irrational	
		number	%	number	%	number	%	number	%
Central	18	17	94.4	4	22.2	3	16.7	10	55.5
North-Western	11	8	72.7	4	36.3	3	27.3	1	9.1
Southern	6	5	83.3	1	16.7	2	33.3	2	33.3
North-Caucasian	7	1	14.3	—	—	—	—	1	14.3
Volga	14	14	100	5	35.7	2	14.3	7	50.0
Ural	6	3	50.0	2	33.3	1	16.7	—	—
Siberian	12	8	66.6	6	50.0	1	8.3	1	8.3
Far Eastern	9	—	—	—	—	—	—	—	—
Russian Federation	*83*	*56*	*67.5*	*22*	*26.5*	*12*	*14.5*	*22*	*26.5*

the economic human, the modern researchers [37, 38] empirically proved the restricted rationality of the human behaviour. This fact is not considered in the contemporary practice of the management of the socio-economic development. For settlement in the remote territories of Russia, economic incentives are applied, for example, "Far East Hectare" or the tax exemptions on the territories of the advanced development.

The rational behaviour of migrants is defined in as the growth of the population inflow to the regions with the more attractive characteristics of the quality of life or the outflow from the less prosperous living environment. The quantitative expression for the rationality (irrationality) is recognized if the level of the positive (negative) reactions of migrants to the territory attractiveness' characteristics is 30 % or more from the maximum possible positive (negative) reaction. The indifferent behaviour is defined here as the migrants' decision about the direction of relocation with no connection to the territory attractiveness characteristics.

To test the regions on the rationality of behaviour, we suggest to determine the reactions of migrants ($\{R_i\}$, where $i = 1, 2, 3, \ldots, 12$) for each of 12 indicators of the territory attractiveness ($\{I_i\}$, where $i = 1, 2, 3, \ldots, 12$) through correlations of these indicators-factors with the coefficients of the migration growth rate in terms of the regions of the Middle cluster. The result is the data array on the correlations of the coefficient of migration growth rate where each of 12 indicators of the territory attractiveness is for each subject in the Middle cluster ($R_{12} \times 56$).

As for the next stage, the types of regions are identified on the basis of the "reflected" characteristics (R_i) during the procedure of the hierarchical clustering using the Ward's method in the package IBM SPSS Statistics. On the second level of agglomeration, 3 types of regions are distinguished: 1) with rational behaviour; 2) with indifferent behaviour; 3) with irrational behaviour. Identification of the types of regions in terms of the character of the migrants' behaviour is performed based on the indicator of the migrants' reaction level to the territory attractiveness' factors. Distribution of the regions of the Middle cluster in terms of types of rationality is demonstrated in the Table 2.

As demonstrated in the Table 2, the type of the Middle cluster with the rational behaviour of migrants is formed by 22 subjects of the Russian Federation, and exactly the same number of subjects belongs to the type of the irrational behaviour. Geographical profile of a migrant with rational behaviour is spread, mainly, in a half of the subjects of the Siberian district and in more than a third of the subjects of the North-Western federal district. Migrant with indifferent behaviour reveals himself more often in the regions of the Southern federal district. Irrational behaviour of migrants of the Middle cluster prevails in the subjects (not less than 50 % from the overall number) of the Central and federal Volga districts. Therefore, the rationality of behaviour is more common in the outskirts of the Middle cluster.

Characteristics of the territory attractiveness by regional types are given in the Table 3.

The reaction level of migrants to the territory attractiveness' characteristics is 44.1 % in the first group. It allows identifying this group of territories as the type with the rational migrants' behaviour, because this dependence of the migration directions from the life quality factors in these regions is direct and quite strong (above 30 %).

For the regional cluster with the rational behaviour of migrants, all their reactions, except

Table 3

Average values of the reactions of migrants to the indicators of the territory attractiveness in the types of regions in terms of rationality of migrants' behaviour

Indicator-factor	Symbol	Extremal value	Coefficient of correlation of migration growth rate with indicator-factor in subtypes of cluster in terms of behaviour of migrants			Average in cluster
			rational	indifferent	irrational	
Real wages	R_1	+1	0.646	0.069	–0.510	0.068
Provision of new housing	R_2	+1	0.612	0.116	–0.696	0.011
Life expectancy	R_3	+1	0.743	0.112	–0.631	0.075
Unemployment rate	R_4	–1	–0.350	–0.026	0.293	–0.028
Level of pensions	R_5	+1	0.554	0.010	–0.642	–0.026
Crime rate	R_6	–1	–0.635	–0.052	0.661	–0.009
Population density	R_7	+1	–0.440	–0.047	0.478	–0.003
Density of motorways	R_8	+1	0.523	–0.010	–0.570	–0.019
Communication services per capita	R_9	+1	0.676	0.089	–0.668	0.032
Exports per capita	R_{10}	+1	0.359	0.151	–0.444	0.022
Share of innovatively active enterprises	R_{11}	+1	0.028	–0.018	0.027	0.012
Share of workers in small enterprises in total number of workers	R_{12}	+1	0.606	0.148	–0.483	0.090
Degree of rationality of behaviour in type	[–12; +12]		5.292	0.699	–5.094	0.299
Reaction level of migrants to the territory attractiveness' characteristics, %	—		44.1	5.8	–42.5	2.5

the population density (R_7), fit into the logic of a pragmatic man, which chooses the most favourable region for living. This feature can be explained by the spatial location of the rational type of the Middle cluster, including the Republics of Karelia and Komi, Altai and Krasnoyarsk regions, Tomsk, Irkutsk and other regions, characterised by not a high population density. The priority of the most important characteristics of the cluster subject territories for migrants is given on the Fig. 3.

The obtained assessments represent the degree of significance of the territory development characteristics for population. Therefore, they can be applied to form the policy of the human-oriented development and to increase the competitiveness of the studied regions in struggling to attract the human capital.

The regional type with the indifferent behaviour of migrants raises more questions. The level of migrants' reactions to the territory attractiveness' characteristics in the second cluster is just 5.8 % from the maximum. Therefore, the changes in the territory attractiveness of regions almost do not affect the migrants' behaviour in this cluster, thus this behaviour is identified as indifferent. According to the coefficients of correlation, the reactions of migrants have weak signals. Nevertheless, the rating of priorities determining the spatial vector of migration in the studied type of regions in the Middle cluster is formed as follows: 1) Exports per capita (R_{10}); 2) Business environment (R_{12}); 3) Provision of new housing (R_2); 4) auspiciousness of the environment for the Life expectancy (R_3).

In the third regional group, the correlation coefficients of the majority of the attractiveness characteristics of territories with the migration growth have a definite negative value, and the degree of rationality of the migrants' behaviour in this type has the maximum negative value (–5.094). The strong feedback loop of the migration directions with the territory attractiveness' factors (reaction level of migrants is 42.5 %, which exceeds 30 %) allows identification of this group of regions as the cluster with irrational behaviour of migrants. Their reactions contradict the logic of a pragmatic person. Irrationality of behaviour appears in the cross-flow of population into the regions with the insufficient level of provision of new housing (R_2) and communication services (R9), with high level of crime (R_6) and less favourable area for life (R_3).

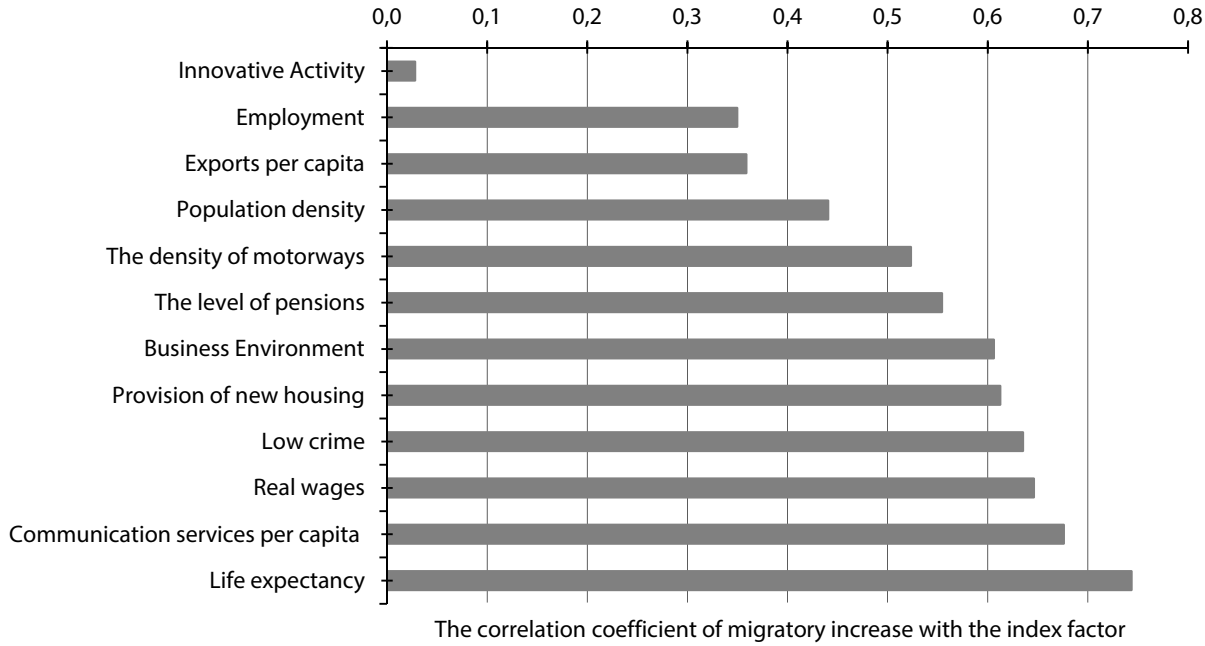

Fig. 3. *Rating of the significance of the territory attractiveness characteristics for the regional type with the rational behaviour of migrants*

3.4. Building the regression models of the migration growth rate coefficients in terms of regional types distinguished by behavioural rationality

The particular qualities of the territory attractiveness in terms of the regional types in the Middle cluster are identified based on the regression analysis of the panel data of the migration growth rate (MGR_j, where $j = 1, 2, 3, \ldots, 56$ — number of the subjects in the Middle cluster) and the indicators of the socio-economic development of the subjects of Russia ($I_i \times j$, where $i = 1, 2, \ldots, 12$ — number of indicators of the territory attractiveness) in 2005–2015. Multifactorial models of the migration growth rate coefficients are constructed using the procedure "Regression" in the IBM SPSS Statistics package. The elimination method (backward) from the full range of factors Ii×j initially included in the model is applied during this stage. Using the least partial factors of correlation, the variables are consequently eliminated from the model until the corresponding regression coefficient is insignificant based on the Student *t*-criterion ($Sig > 0.05$).

In Table 4 we have shown the results of building the models of regression of the migration growth rate coefficient for the whole Middle cluster of the Russian regions and the types identified in its composition.

The data from the Table 4 (column Sig.) illustrate that all regression coefficients of the independent variables left in the models are statistically significant, because Sig. < 0.05, and the standard errors for each coefficient are less than their estimations. Along with this, assessment of the quality of the constructed models of the multiple regression is performed based on the linear coefficients of the multiple correlation (R), determination coefficients (R^2) and *F*-statistics. Satisfactory values of the all mentioned criteria (namely, $R > 0.7$, $R^2 > 0.5$, calculated value of the *F*-statistics is higher than critical) allow stating that all the suggested regression models for migration growth rate coefficients by cluster types and by cluster in general are statistically significant and acceptable practically.

Models of migration growth rate coefficients for the whole Middle cluster of subjects and its types are given in the Table 5.

The obtained results provide the evidence that the identification of the homogeneous types of regions in the Middle cluster in terms of the reactions of migrants facilitates the improvement of the statistical characteristics of the migration growth rate coefficient models. Thus, for example, the multiple correlation coefficient in the model for the whole cluster is 0.723, for the type with the rational behaviour of migrants — 0.760, with irrational behaviour — 0.793, and with indifferent — 0.934.

The significance of the specific factors of the territory attractiveness in the regional types of the Middle cluster can be considered using the standardized beta-coefficient of regression of models (Table 6).

4. Discussion

The following factors have the main impact on the level of the migration coefficient in the rational type of regions: 1) Life expectancy; 2)

Table 4

Parameters of the models* of the multiple regression of the migration growth rate coefficient by types of the Middle cluster

Territory attractiveness characteristics	Unstandardized Coefficients		Standardized Beta-coefficient	*Sig.*	R^2	*R*	*F*
	B	Std. Error					
1. Type in cluster with rational behaviour of migrants							
Constant	–68.835	11.395		.000	0.577	0.760	37.095 higher than critical value 2.639 with 7 and 190 degrees of freedom
Provision of new housing	3.113	.587	.379	.000			
Life expectancy	.860	.168	.412	.000			
Unemployment rate	–.023	.012	–.096	.002			
Crime rate	.017	.004	.272	.000			
Population density	.072	.016	.273	.000			
Communication services per capita	–1.339	.314	–.361	.000			
Share of workers in small enterprises in total number of workers	.415	.074	.357	.000			
2. Type in cluster with indifferent behaviour of migrants							
Constant	58.546	11.312		.000	0.872	0.934	84.636 higher than critical value 2.663 with 8 and 99 degrees of freedom
Provision of new housing	1.829	.386	.305	.000			
Life expectancy	–.612	.169	–.212	.000			
Level of pensions	–.102	.012	–.435	.000			
Crime rate	–.042	.005	–.403	.000			
Communication services per capita	1.353	.183	.484	.000			
Exports per capita	.514	.160	.144	.002			
Share of innovatively active enterprises	–.408	.090	–.190	.000			
Share of workers in small enterprises in total number of workers	.217	.097	.103	.027			
3. Type in cluster with irrational behaviour of migrants							
Constant	21.814	6.986		.002	0.629	0.793	35.466 higher than critical value 2.407 with 9 and 188 degrees of freedom
Real wages	.028	.006	.380	.000			
Provision of new housing	2.134	.402	.412	.000			
Life expectancy	–.355	.103	–.252	.001			
Unemployment rate	.028	.012	.125	.022			
Level of pensions	–.087	.009	–.730	.000			
Crime rate	–.011	.003	–.197	.002			
Population density	.108	.012	.473	.000			
Exports per capita	–.483	.152	–.190	.002			
Share of workers in small enterprises in total number of workers	.126	.057	.127	.028			
Middle cluster in general							
Constant	2.406	1.790		.180	0.523	0.723	67.826 higher than critical value of 2.511 with 8 and 495 degrees of freedom
Real wages	.013	.005	.129	.016			
Provision of new housing	1.190	.323	.192	.000			
Level of pensions	–.074	.008	–.424	.000			
Crime rate	–.017	.003	–.237	.000			
Population density	.069	.009	.352	.000			
Communication services per capita	.464	.160	.144	.004			
Exports per capita	.380	.145	.104	.009			
Share of workers in small enterprises in total number of workers	.172	.052	.126	.001			

* The dependent variable: Migration growth rate coefficient, people / 1000 people.

Table 5

Models of migration growth rate coefficients (*MGRC*) by the regional types in the Middle cluster in terms of the rationality of behaviour

Type Regions	Compositions of regions	
1. With rational behaviour of migrants	1. Altai region 2. Irkutsk region 3. Kaliningrad region 4. Kirov region 5. Kostroma region 6. Krasnoyarsk region 7. Kursk region 8. Nizhniy Novgorod region 9. Novosibirsk region 10. Omsk region 11. Orenburg region	12. Orel region 13. Perm region 14. Pskov region 15. The Republic of Adygea 16. The Republic of Karelia 17. The Republic of Komi 18. Saratov region 19. Sverdlovsk region 20. Tomsk region 21. Chelyabinsk region 22. Yaroslavl region
$MGRC1 = -68.835 + 3.113 \cdot I_2 + 0.860 \cdot I_3 - 0.023 \cdot I_4 + 0.017 \cdot I_6 + 0.072 \cdot I_7 - 1.339 \cdot I_9 + 0.415 \cdot I_{12}$		
2. With indifferent behaviour of migrants	23. Astrakhan region 24. Vologda region 25. Ivanovo region 26. Krasnodar region 27. Kurgan region 28. Leningrad region	29. Moscow region 30. Novgorod region 31. The Republic of Bashkortostan 32. The Republic of Khakassia 33. Tambov region 34. The Republic of Chuvashia
$MGRC2 = 58.546 + 1.829 \cdot I_2 - 0.612 \cdot I_3 - 0.102 \cdot I_5 - 0.042 \cdot I_6 + 1.353 \cdot I_9 + 0.514 \cdot I_{10} - 0.408 \cdot I_{11} + 0.217 \cdot I_{12}$		
3. With irrational behaviour of migrants	35. Arhangelsk region 36. Belgorod region 37. Bryansk region 38. Vladimir region 39. Volgograd region 40. Voronezh region 41. Kaluga region 42. Kemerovo region 43. Lipetsk region 44. Penza region 45. Rostov region	46. The Republic of Mari El 47. The Republic of Mordovia 48. The Republic of Tatarstan 49. Ryazan region 50. Samara region 51. Smolensk region 52. Stavropol region 53. Tver region 54. Tula region 55. Udmurtia 56. Ulyanovsk region
$MGRC3 = 21.814 + 0.028 \cdot I_1 + 2.134 \cdot I_2 - 0.355 \cdot I_3 + 0.028 \cdot I_4 - 0.087 \cdot I_5 - 0.011 \cdot I_6 + 0.108 \cdot I_7 - 0.483 \cdot I_{10} + 0.126 \cdot I_{12}$		
Middle cluster in general	56 subjects	
$MGRC = 2.406 + 0.013 \cdot I_1 + 1.190 \cdot I_2 - 0.074 \cdot I_5 - 0.017 \cdot I_6 + 0.069 \cdot I_7 + 0.464 \cdot I_9 + 0.380 \cdot I_{10} + 0.172 \cdot I_{12}$		

Table 6

Standardized beta-coefficients of regression in the migration growth rate model for the regional types in the Middle cluster

Indicator-factor	Symbol	Regional type by migrants' behaviour		
		Rational	Indifferent	Irrational
Real wages	I_1			0.380
Provision of new housing	I_2	0.379	0.305	0.412
Life expectancy	I_3	0.412	–0.212	–0.252
Unemployment rate	I_4	–0.096		0.125
Level of pensions	I_5		–0.435	–0.730
Crime rate	I_6	0.272	–0.403	–0.197
Population density	I_7	0.273		0.473
Communication services per capita	I_9	–0.361	0.484	
Exports per capita	I_{10}		0.144	–0.190
Share of innovatively active enterprises	I_{11}		–0.190	
Share of workers in small enterprises in total number of workers	I_{12}	0.357	0.103	0.127

Provision of new housing; 3) Auspiciousness of the entrepreneurial environment.

For the type of the region with indifferent behaviour of migrants, the factors of economic development are the most attractive. They include the provision of communication services, provision of new housing and exports per capita. The auspiciousness of crime situation also influences the behaviour of migrants. All these factors reflect motivation of the spatial flows of population related to the physiological needs and the physical safety.

The most attractive features for migrants with the irrational behaviour, moving into the Middle cluster, include: 1) Population density; 2) indicators of the level of life (Provision of new housing and Real wages); 3) condition of the entrepreneurial environment.

The research results allow stating the different reactions of migrants to the objective characteristics of the territory attractiveness for living for groups of regions. It is notable, that the study is performed in the most comparable conditions of other factors, because these are the regions of the same country and of the same cluster of this country with homogeneous objective characteristics of the life's quality. This research does not answer the question why migrants behave rationally in some regions, and irrationally in the others. The answer to this question is related to the perspective of the further research. The authors can suggest that the following is present: 1) informational asymmetry about the attractiveness of territory for resettlement; 2) decision-making of migrants is influenced by diasporas; 3) stimulation/prevention factors that distort the migration results towards the regions favourable for life, for example, changes in the strategic zones of economic management of large corporations or by realization of resettlement programs in the regions. These hypotheses need to be tested in the future.

The practical significance of the obtained results of the correlation (Table 3) and regression (Table 4 and 5) analysis is in the opportunity to create the important instruments for managing the spatial development specifically for the Russian territories which require resettlement. Attracting the human capital and keeping the residents from emigration requires accounting for the positive and negative reactions to form the socio-economic policy, differentiated by the regional types. The obtained results are the basis for redistribution of the limited funds of the federal and regional budgets directed to improve the quality of life for Russians.

5. Conclusions

Based on the conducted study, we can formulate the following conclusions.

1. Factors of the territory attractiveness for migration can be distinguished as objective and subjective. For assessing the objective factors we applied the indicators of the life's quality of the territory's physical and institutional space of the territory that contribute to meeting the needs of the population. Subjective factors are the factors of the mental space ("reflected" factors).

2. Results of studying the dependence of the migration growth coefficient on the objective characteristics of the attractiveness of the Russian regional space allow stating the following. Firstly, not all of the migrants behave rationally. Secondly, the regional space of the Russian Federation is heterogeneous in terms of the objective and subjective characteristics of the quality of life. Thus, distinguishing the regional types should be performed in terms of both the objective and subjective characteristics.

3. We identified the regional clusters in terms of the 12 characteristics of the territory attractiveness using the Ward's method and IBM SPSS Statistics package. The study was based on the array of the panel data for 11 years for 83 regions of the Russian Federation. We distinguished 4 clusters on the 6th level of agglomeration which are identified as the Middle cluster (56 regions), Northern cluster (18 regions), Southern cluster (7 regions) and Agglomeration cluster (2 regions), according to the spatial characteristics.

4. The degree of rationality of the migrants' behaviour of the Middle cluster is determined in terms of the reflected characteristics that are the correlation coefficients between the objective regional attractiveness' characteristics and the regional coefficients of the migration growth rate. The rational (irrational) behaviour is defined as the growth of the population inflow (outflow) to (from) the regions where the territory characteristics are more attractive for living. The rationality (irrationality) is identified if the level of the migrants' positive (negative) reactions to the factors of the territory attractiveness is no less than 30 % from the maximum possible level (using the module value). The indifferent behaviour is defined as the migrants' choice of directions of the interregional relocation that are almost independent from the territory attractiveness for living (when the correlation coefficients are close to zero).

5. Based on the array of the panel data for the reflected characteristics (array 12 by 56 by 11), the procedure of the secondary clustering allowed identification of 3 types of the regions in the

Middle cluster. According to the accepted criteria for the identification of the migrants' behavioural type, the Russian regions are classified by subclusters as follows: 1) 22 regions with the rational behaviour of the migrants; 2) 12 regions with the indifferent behaviour of the migrants; 3) 22 regions with the irrational behaviour of the migrants.

6. Building the regression models of the migration growth coefficient for each type of regions and the whole Middle cluster allows identifying the factors of attractiveness of its territories for migrants.

Using the values of the standardized coefficients of regression, we formed the array of the substantiating materials for applying the differential approach to managing the development of the different types of regions. The following results obtained in this study are important for development and formation of the new centres of the economic growth that require concentration of population in the regional space of the Middle cluster:

1. Improvement of the entrepreneurial environment is able to provide 3 times larger effect in terms of the clear migration inflow in the regions with the rational behaviour, rather than in the regions with the indifferent or irrational behaviour.

2. Implementation of the measures stimulating the growth of the life expectancy and the increase of the employment level will allow achieving the expected result only in the regions with the rational type of migrants' behaviour.

3. Development of the telecommunication connectedness of the regional space allows increasing the regional attractiveness only in the regions with the indifferent behaviour of migrants.

4. Increase in the real wages can affect the population inflow to the regions with the irrational behaviour and does not influence the other types of regions.

5. Growth of the population density (for example, during the development of the economic growth centres) is 2 times more important for the regions with the irrational behaviour of migrants than for the regions with the rational behaviour. Additionally, it does not influence the regions with the indifferent behaviour.

The perspective of the further research in this direction is related to the identification of the reasons of the migrants' irrational behaviour.

Further scientific research can be developed in two directions. Firstly, it is interesting to clatify the reason of the migrants' indifferent or irrational behaviour from the standpoint of the economic human. The results of the conducted research confirm that the model of economically rational human is unrealistic. People making decisions don't consider the costs and benefits only. Trentmann [40] urges to avoid the mistakes of economists and to study the views, practices and relationships which are typical for different cultures. Secondly, the technology of shaping the mechanisms the spatial development's management based on the differentiations of regional priorities requires a concrete definition and the assessment of effectiveness.

Acknowledgements

The article has been prepared in accordance with the plan of Institute of Economics of the Ural Branch of RAS for 2019–2021.

References

1. Ariu, A., Docquier, F. & Squicciarini, M. P. (2016). Governance quality and net migration flows. *Regional Science and Urban Economics, 60,* 238–248.

2. Bove, V. & Ella, L. (2017). Migration, Diversity and Economic Growth. *World Development, 89,* 227–239.

3. Acemoglu, D. & Johnson, S. (2005). Unbundling institutions. *Journal of Political Economy, 113(5),* 949–995.

4. Acemoglu, D., Johnson, S. & Robinson, J. (2005). The rise of Europe: Atlantic trade, institutional change and economic growth. *American Economic Review, 95(3),* 546–579.

5. Daunton, M. (2010). Rationality and institutions: reflections on Douglass North. *Structural Change and Economic Dynamics, 21,* 147–156.

6. Bertoli, S., Brucker, H. & Moraga, J. F. (2016). The European crisis and migration to Germ. *Regional Science and Urban Economics, 60,* 61–72.

7. Chen, C. & Zhao, M. (2017). The undermining of rural labor out-migration by household strategies in China's migrant-sending areas: The case of Nanyang, Henan Province. *Cities, 60,* 446–453.

8. Chang, T. C. & Raguraman, K. (1996). Singapore Tourism: Capital Ambitions and Regional Connections, 47–63.

9. Coulson, N. E. & Grieco, P. L. E. (2013). Mobility and mortgages: Evidence from the PSID. *Regional Science and Urban Economics, 43,* 1–7.

10. Champion, C., Monnesland, J. & Vandermottens, C. (1996). The New Regional Map of Europe. *Progress in Planning, 46,* 1–89.

11. Stiglitz, J. E., Sen, E. A. & Fitoussi, J.-P. (2009). *Report by the Commission on the Measurement of Economic Performance and Social progress.* Retrieved from: www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf. (Date of access: 15.09.2018)

12. Chereshnev, V. A. & Tatarkin, A. I. (Eds). (2015). *Sotsialno-ekonomicheskiy potentsial kak osnova postupatelnogo razzvitiya postprtrstroechnoy Rossii [Socio-Economic Potential as a Basis of Progressive Development in Post-Restructuring Period of Russia].* Moscow: Ekonomika Publ., 1039. (In Russ.)

13. Drobysheva, V. V. & Gerasimov, B. I. (2004). *Integralnaya otsenka kachestva zhizni naseleniya regiona [Integrative assessment of quality of life of the population of the region].* Tambov: Tambov State Technical University, 108. (In Russ.)

14. Grinchel, B. M. & Nazarova, E. A. (2015). Typology of regions by level and dynamics of the quality of life. Ekonomicheskie i sotsialnye peremeny: fakty, tendentsii, prognoz [Economic and Social Changes: Facts, Trends, Forecast], 3(39), 111–125. DOI: 10.15838/esc/2015.3.39.9.

15. Kurushina, E. V. & Druzhinina, I. V. (2015). Demographic transformations of the Russian regional space]. *Ekonomicheskie i sotsialnye peremeny: fakty, tendentsii, prognoz [Economic and Social Changes: Facts, Trends, Forecast], 3(39),* 126–140. DOI: 10.15838/esc/2015.3.39.10.

16. Petrov, M. B., Kurushina, E. V. & Druzhinina, I. V. (2018). Institutional Response of Regional Socio-Economic Systems to Investing in Human Capital Increment: Assessment Technique. *Ekonomicheskie i sotsialnye peremeny: fakty, tendentsii, prognoz [Economic and Social Changes: Facts, Trends, Forecast], 11(3),* 195–214. DOI: 10.15838/esc.2018.3.57.13.

17. Tkachev, A. N. & Lutsenko, E. V. (2004). Kachestvo zhizni naseleniya, kak integralnyy kriteriy otsenki effektivnosti deyatelnosti regionalnoy administratsii [The quality of life of the population as an integral criterion of estimation of efficiency of activity of regional administrations]. Politematicheskiy setevoy elektronniy nauchniy zhurnal Kubanskogo gosudarstvennogo agrarnogo universiteta [Polythematic online scientific journal of Kuban State Agrarian University], 4, 71–85. (In Russ.)

18. Costanza, R. et al (2008). An Integrative Approach to Quality of Life Measurement, Research, and Policy. *SAPIENS, 1(1),* 17–21.

19. Cummins, R. A. (1997). *Comprehensive Quality of Life Scale — Adult Manual (5th Edition).* School of Psychology, Deakin University, Melbourne, 1–51.

20. Inoguchi, T. & Fujii, S. (2013). *The Quality of Life in Asia — A Comparison of Quality of Life in Asia.* Dordrecht: Springer science + Business Media B. V., 99–198.

21. McCrea, R., Stimson, R. & Marans, R. W. (2011). The Evolution of Integrative Approaches to the Analysis of Quality of Urban Life. In: *R. W. Marans, R. Stimson (Eds.), Investigating Quality of Urban Life — Theory, Methods, and Empirical Research* (pp 77–106). eBook. Springer.

22. Savchenko, T. N. & Golovina, G. M. (2006). *Subektivnoe kachestvo zhizni: podkhody, metody otsenki, prikladnye issledovaniya [Subjective quality of life: approaches, assessment methods, applied research].* Moscow: Institute of psychology RAS, 170. (In Russ.)

23. Shastitko, A. E. (2011). *Model cheloveka v ekonomicheskoy teorii [Model of man in economic theory].* Moscow: INFRA-M, 142. (In Russ.)

24. Fauconnier, G. (1985). *Mental spaces.* Cambridge, Mass.: MIT Press, 185.

25. Simon, H. A. (1955). Behavioral Model of Rational Choice. *Quarterly Journal of Economics, 69,* 99–118.

26. Marans, R. W. (2012). Quality of Urban Life Studies: An Overview and Implications for Environment — Behaviour Research. *Procedia — Social and Behavioral Sciences, 35,* 9–22.

27. Mohit, M. A. (2014). Present Trends and Future Directions of Quality-Of-Life. *Procedia — Social and Behavioral Scences, 153,* 655 — 665.

28. Brock, D. (1993). Quality of life in healthcare and medical ethics. Title of chapter. In: *M. Nussbaum, A. Sen (Eds.), The Quality of Life* (pp. 95–132). Oxford: Clarendon Press.

29. Xiong, Y. & Zhang, J. (2014). Applying a Life-oriented Approach to Evaluate the Relationship between Residential and Travel Behavior and Quality of Life Based on an Exhaustive CHAID Approach. *Procedia — Social and Behavioral Sciences, 138,* 649 — 659.

30. Alderfer, C. P. (1972). *Existence, Relatedness, and Growth: Human Needs in Organizational Settings.* New York: Free Press, 198.

31. Allardt, E. Ed. (1993). Having, Loving, Being: An Alternative to the Swedish Model of Welfare Research. In: *M. Nussbaum, A. Sen (Eds.), The Quality of Life* (pp. 88–94). Oxford: Clarendon Press.

32. Arndt, J. (1981). Marketing and the Quality of Life. *Journal of Economic Psychology, 1,* 283–301.

33. Maslow, A. (1954). *Motivation and Personality.* New York: Harper, 411.

34. McClelland, D. C. (1970). The Two Faces of Power. *Journal of International Affairs, 24,* 30–41.

35. Murray, H. A. (1938). *Exploration in Personality.* New York: Oxford University Press, 531–545.

36. Kurushina, E. V. & Druzhinina, I. V. (2016). Factors of attractiveness of the Russian regions for migrants. *Man in India, 96(10),* 3599–3611.

37. Tversky, A. & Kahneman, D. (1982). Judgment of and by representativeness. In: *D. Kahneman, P. Slovic, A. Tversky (Eds.), Judgment under Uncertainty: Heursitics and Biases* (pp. 84–98). New York: Cambridge university press.

38. Smith, V. (1982). Microeconomic Theory as Experimental Science. American Economic Review, 72, 923–955.

39. Kolmakov, V. V., Polyakova, A. G., Karpova, S. V. & Golovina, A. N. (2019). Razvitie klasterov na osnove konkurentnoy spetsializatsii regionov [Cluster Development Based on Competitive Specialization of Regions]. *Ekonomika regiona [Economy of Region], 15(1),* 270–284. DOI: 10.17059/2019–1-21 (In Russ.)

40. Trentmann, F. (2008). *Free Trade Nation: Commerce, Consumption, and Civil Society in Modern Britain.* Oxford, 360–361.

Authors

Mikhail Borisovich Petrov — Doctor of Engineering, PhD in Economics, Associate Professor, Head of the Productive Forces Development and Placement Centre, Institute of Economics of the Ural Branch of RAS; ORCID: 0000–0002–3043–6302; Researcher ID: B-9467–2018 (29, Moskovskaya St., Ekaterinburg, 620014, Russian Federation; e-mail: michpetrov@mail.ru).

Elena Viktorovna Kurushina — PhD in Economics, Associate Professor, Department of Economics and Production Management, Tyumen Industrial University; ORCID: 0000–0002–5608–2020; Researcher ID: A-6615–2018 (38, 50 let Oktyabrya St., Tyumen, 625027, Russian Federation; e-mail: kurushina.tsogu@yandex.ru).

Irina Vasilevna Druzhinina — PhD in Sociology, Associate Professor, Department of Economics and Production Management, Tyumen Industrial University; ORCID: 0000–0003–2201–422X; Researcher ID: C-1732–2018 (38, 50 let Oktyabrya St., Tyumen, 625027, Russian Federation; e-mail: 030370div@gmail.com).